

RIVER STAGES AND FLOODS FOR MAY 1948

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River stages during May were mostly above normal in the Coastal States along the Atlantic, the Pacific and the East Gulf of Mexico drainage areas. Stages were also above normal in the Ohio Valley, the upper Mississippi and eastern North Dakota. The greatest negative departures from normal of the stations tabulated were at Demopolis, Ala., and Vicksburg, Miss., where the stages averaged 7.3 and 6.3 feet below normal, respectively.

Most severe flooding during the month developed in the Pacific Northwest during the last half of the month. Flooding continued severe into the last decade of June. The flood on the Columbia and tributaries was the most devastating of record although the stages generally were lower than the great flood of 1894. The Kootenai River in northern Idaho exceeded the flood of 1894 at Bonners Ferry. Severe flooding occurred on the Sheyenne River in eastern North Dakota, and major flooding occurred on the Rio Grande River in northern New Mexico.

At Fairbanks, Alaska, the worst flood in 11 years was experienced. The Chena River rose 13 feet 4½ inches from the time the ice moved on May 10 until it reached its crest on the morning of May 22. One-fifth of the total area of Fairbanks was flooded. Residents were forced to evacuate their homes in the lowest part of the city which was covered with water up to 10 feet. This flood resulted from unusual weather which prevailed over the interior of Alaska during April. At Fairbanks the snowfall for April measured 25.1 inches or a water equivalent of 2.30 inches. This was the greatest amount that had ever been measured in April during the 43 years of record. There was practically no thawing weather during April. Above normal temperatures during the early part of May caused rapid melting of the snow cover over the Chena watershed.

Hudson Bay drainage.—Severe flooding occurred on the Sheyenne River, a tributary of the Red River of the North, during the last half of April and the first half of May. The flood was due to snow melt from the vicinity of, and north of Sheyenne, N. Dak. The river overflowed highways at Sheyenne on April 19, crested at Valley City, N. Dak., on April 27 and approached within a foot of the record stage of 1943 at West Fargo on May 10.

In Valley City, 35 families were evacuated because of high water. Some flooding of farm lands resulted between Horace, N. Dak., and West Fargo in areas where banks are low. In Cass County the flooding of 10,000 acres caused a loss to crops of about one-third of this acreage.

St. Lawrence drainage.—Light to moderate flooding occurred in the Lake Michigan drainage area in the upper Grand and Saginaw River Basins between the 10th and 15th. Rapid rises resulted when heavy rains fell during the afternoon and night of May 9 on ground that was thoroughly saturated from the heavy rains of March and April. The rains over the upper Grand Basin averaged nearly 2½ inches and over the Saginaw Basin about 1 inch. The flooding was the most severe in the Lansing, Mich., area near the confluence of the Grand and Red Cedar Rivers. The Red Cedar crested one-half foot below the March flood at Williamston, Mich., and 0.1 foot below, at East Lansing, Mich. At Lansing, Mich., on the Grand River, the crest was 1.6 feet below the one in March.

Three major floods and one minor flood have occurred in this area in 14 months. The Grand River did not overflow below Lansing but approached within one-half foot of bankfull stage at Ionia and Lowell, Mich., and within 2 and 3 feet at Grand Rapids and Portland, Mich., respectively. Property loss due to flood waters was negligible at Owosso and Williamston, Mich. At other points, the damages were principally to growing crops and secondary roads.

Atlantic Slope drainage.—About 7.74 inches of rain fell during the month in the vicinity of Portland, Maine, the greatest on record for May. Nearly all the rivers and streams in Maine were brought to near bankfull stage following the heavy rain on the 17th and 18th. Minor flooding took place along the immediate vicinity of river banks from the 18th to the 24th with practically no damage. Storage reservoirs which were only one-half full at the beginning of the month were almost to capacity by the 31st.

River stages in New Hampshire remained moderately high throughout the month. Precipitation averaged nearly twice normal with some measureable rain occurring on 18 to 20 days.

Heavy rains caused some overflow in Perkiomen Creek in Pennsylvania on the 13th with a crest of 10.2 feet at Fairmount Dam at Philadelphia. No damage resulted other than the temporary closing of one or two sections of the highways.

There were flash floods in the Chickahominy River tributaries in New Kent and Charles City Counties, Va., on the 26th. Major damage resulted to the Chesapeake and Ohio railroad track and U. S. Highway No. 60, east of Windsor Shades, Va. One hundred twenty feet of track fill were washed out, leaving the rails suspended about 40 feet in the air. There was some damage to crops and secondary roads in the swampy area north of Highway No. 60.

An important rise occurred in tidewater in the lower Potomac at Washington, D. C., on May 7 as a result of prolonged strong southeasterly winds. The highest stage reached was 5.8 feet during high tide at 6:48 a. m. This was 2.5 feet above normal and the highest tidal stage resulting from wind effects since September 18, 1945. Some light overflows occurred in low places with no damage. A slight overflow occurred on the Roanoke River at Alta Vista, Va., on the 14th as a result of locally heavy rains. No damage resulted.

Upper Mississippi Basin.—Light to moderate flooding occurred in the extreme upper Mississippi River at Aitkin and Fort Ripley, Minn., during April and May. This overflow was due to rapid snow melt and moderate to heavy rain.

The snowfall over northern Minnesota during the winter season (November–March) was approximately 50 percent above normal. The snow cover, which was affected very little by occasional thaws or evaporation during the season, began melting during the closing days of March. On April 8th flood stage was reached at Aitkin, Minn. Flooding was prolonged until May 18 by heavy rains on April 19–20 and April 22–27.

Secondary roads and approximately 15,000 acres of farm lands in Aitkin County were inundated for several weeks. Eighty families were evacuated and livestock and tangible property moved. The greatest loss from the high water was to prospective crops.

Arkansas Basin.—Minor flooding occurred on the Neosho River in the vicinity of Emporia, Kans., and on the Poteau near Poteau, Okla., during the first half of May. A second substantial rise occurred on the Neosho River below LeRoy, Kans., near the middle of the month but bankfull stages were not reached.

The overflow in the Neosho River was due to heavy afternoon and evening showers on May 1. (Council Grove, Okla., reported 2.14 inches.) The flooding on the Poteau was due to an average rainfall of 3 inches on May 10–11.

The only damages resulting from these overflows were along the Neosho River. Approximately 10,000 acres of farm land were inundated and considerable damage resulted to recently planted corn. Some damage was done to highways and bridges.

Red Basin.—Heavy thundershowers which averaged 4.36 inches over the Sulphur River Basin on the 10th and 11th resulted in a stage of 7.4 feet above flood stage at Naples, Tex., on the 15th. The heaviest rainfall reported was 6.33 inches. Moderate rains on the 16th–17th and 24th–25th prolonged the high water.

Rains of 2½ to 6 inches over the Cypress Basin on the 10th and 11th resulted in flood waters of nearly 5 feet above bankfull at Jefferson, Tex., on the 17th. The rainfall over the Little River Basin during the same period averaged 4.02 inches and resulted in minor flooding at Horatio and Whitecliffs, Ark.

Lower Mississippi Basin.—The Tallahatchie and Yazoo Rivers continued to fall slowly during the month from the peak crests reached in February and March. The Tallahatchie fell below flood stage at Swan Lake, Miss., on the 1st and the Yazoo at Yazoo City, Miss., on the 17th.

Light flooding occurred on the St. Francis River at Fisk, Mo., on the 19th and 20th following the light to heavy rain over the basin on the 16th. The heaviest amount reported was 3.30 inches at Fredericktown, Tenn.

West Gulf of Mexico drainage.—Moderate rains on the 4th and 6th and heavy rains on the 11th and 12th over the Sabine Basin resulted in moderate flooding at Mineola, Tex., and Gladewater, Tex. Considerable damage occurred in the oilfields near Gladewater.

Light to moderate flooding occurred on the Trinity River in Texas from the 11th to the 30th and on the East Fork from the 12th to the 15th as a result of the heavy rains over the upper Trinity River Basin on the 10th and 11th. No damage was reported.

A major flood occurred on the Rio Grande in New Mexico as a result of snow melt and heavy rainfall near the crest dates. The highest stages since 1941 were reached at Albuquerque and Embudo, N. Mex., and the highest since 1942 at Otowi Bridge, San Acacia, and San Marcial, N. Mex.

Columbia Basin.—During the latter part of May and continuing into June, flood stages occurred in the Columbia River Basin, which, within the period of record, were exceeded only by the great flood of 1894; at Bonners Ferry, Idaho, the stage of the Kootenai River exceeded that flood. A critical feature of the flood, in addition to the extremely high stages, was the long duration of the flood stages at Portland, Oreg.; flood stage was exceeded

on May 22 and the river was still above the flood level on June 30. In addition the Portland stage remained above the 29-foot stage for about 15 days.

The flood may be attributed to the combination of the following factors: (1) An abnormally high accumulation of snow in the basin. (2) Low temperatures in the early spring followed by an abrupt change to excessively high temperatures over the entire basin in the late spring. (3) Heavy rains coincident with the high temperatures.

Precipitation over the basin from October 1947 through April 1948, averaged well above normal except over the upper portion of the Snake River Basin in southern Idaho. The central portion of the Columbia Basin, in northern Idaho and adjoining portions of eastern Washington and western Montana, had as much as 150 percent of the normal precipitation for that period. The possibilities of a major flood in the upper Columbia became evident from the winter accumulation of precipitation as early as March 1, as indicated in the issue of the Water Supply Forecast bulletin on that date. The increase in the flood hazard, extending along the entire main stem of the Columbia, was noted in subsequent issues of the bulletin on April 1 and May 1. With the exception of one week in April, temperatures were below normal from March until about May 15, retarding normal melting during April and early May. Above normal precipitation in the first half of May also accentuated the accumulation of snow on the ground.

By mid-May, a low pressure system over northern California and a high pressure ridge to the east induced a flow of warm moist air over the basin. The high temperatures were general over the entire basin and extended to high elevations, leading to nearly simultaneous melting from all portions of the area. These high temperatures prevailed during the last half of May and the first of June.

Heavy rains with considerable thunderstorm activity also prevailed during this period. For the entire month of May, precipitation amounts were generally excessive with as much as 450 percent of normal over the main Columbia above the Snake River, and over 200 percent of normal in much of the basin except in the Snake River basin. The precipitation was excessive in both halves of May, being mainly in form of snow in the first half.

Heavy rains continued well into June. For the first 3 weeks of June, precipitation exceeded 500 percent of normal in eastern Washington and well above normal in much of the remainder of the basin.

Provisional data indicate that the Columbia River at Portland reached a first crest of over 29.9 feet on June 1 and remained above 29 feet until June 16, with a high stage of near 30 feet on June 13–14, compared to a stage of about 33 feet in 1894. The Kootenai River at Bonners Ferry, Idaho, crested at 35.3 feet on May 29, exceeding the 34 foot stage established there in 1894. The greatest single disaster of this flood was the inundation of Vanport, Oreg., due to a break in the levee. In addition to the loss of life at Vanport, many lives were lost in other parts of the basin. On the basis of lives lost and property damage, this flood doubtless is the most disastrous in the history of the basin. A more complete report of this flood will be given in a later issue of the Review.

FLOOD STAGE REPORT FOR MAY 1948

[All dates in May unless otherwise specified]

FLOOD STAGE REPORT FOR MAY 1948—Con.

| River and station | Flood stage | Above flood stages— dates | | Crest ¹ | |
|---------------------------------------|-------------|------------------------------|------------------|--------------------|------------|
| | | From— | To— | Stage | Date |
| ST. LAWRENCE DRAINAGE | | | | | |
| Lake Michigan | | | | | |
| Red Cedar: | Feet | | | Feet | |
| Williamston, Mich..... | 7 | 10 | 14 | 10.2 | 10 |
| East Lansing, Mich..... | 8 | 10 | 15 | 11.2 | 11 |
| Grand: Lansing, Mich..... | 11 | 11 | 14 | 13.2 | 12 |
| Lake Huron | | | | | |
| Shiawassee: Owosso, Mich..... | 7 | 10 | 15 | 8.0 | 10 |
| ATLANTIC SLOPE DRAINAGE | | | | | |
| Kennebec: Augusta, Maine..... | 13 | 19 | 19 | 15.0 | 19 |
| Susquehanna: | | | | | |
| Oneonta, N. Y..... | 12 | 17 | 18 | 12.5 | 17 |
| Vestal, N. Y..... | 14 | 24 | 24 | 14.1 | 24 |
| Roanoke: Alta Vista, Va..... | 10 | 14 | 14 | 10.5 | 14 |
| Ocmulgee: Lumber City, Ga..... | 12 | Apr. 1 | Apr. 30 | 18.8 | Apr. 3 |
| MISSISSIPPI SYSTEM | | | | | |
| Upper Mississippi Basin | | | | | |
| Pecatonica: Freeport, Ill..... | 10 | 11 | 17 | 11.9 | 13 |
| Rock: Moline, Ill..... | 10 | 13 | 22 | 10.7 | 15, 17 |
| Mississippi: | | | | | |
| Aitkin, Minn..... | 12 | Apr. 8 | 18 | 15.8 | Apr. 28 |
| Fort Ripley, Minn..... | 10 | Apr. 26 | 6 | 10.7 | Apr. 30 |
| Louisiana, Mo..... | 12 | Apr. 1 | 2 | 12.2 | 2 |
| | | 4 | 19 | 12.6 | 14 |
| Missouri Basin | | | | | |
| James: Huron, S. Dak..... | 9 | Apr. 1 | Apr. 6 | 12.9 | Apr. 1 |
| Republican: | | | | | |
| Benkelman, Nebr..... | 5 | 23 | 23 | 5.1 | 23 |
| Cambridge, Nebr..... | 5 | 24 | 24 | 5.5 | 24 |
| | | 30 | (²) | 6.6 | 30 |
| Ohio Basin | | | | | |
| Scioto: LaRue, Ohio..... | 11 | 15 | 15 | 11.4 | 15 |
| Wabash: | | | | | |
| Wabash, Ind..... | 12 | 8 | 9 | 15.3 | 8 |
| Lafayette, Ind..... | 11 | 8 | 10 | 14.0 | 9 |
| | | 13 | 16 | 14.5 | 14 |
| Covington, Ind..... | 16 | 10 | 10 | 16.6 | 10 |
| | | 14 | 17 | 18.1 | 15 |
| Terre Haute, Ind..... | 14 | 14 | 19 | 15.2 | 17 |
| | | | | 40.7 | Apr. 2 |
| Tennessee: Kentucky Dam, Ky..... | 31 | Mar. 24 | Apr. 30 | 39.2 | Apr. 16 |
| | | | | 41.3 | Apr. 24—25 |
| Ohio: | | | | | |
| Mount Vernon, Ind..... | 35 | Mar. 28 | Apr. 30 | 41.4 | Apr. 4 |
| | | | | 47.1 | Apr. 23 |
| Dam No. 49, Uniontown, Ky..... | 37 | Mar. 29 | Apr. 30 | 43.7 | Apr. 5 |
| | | | | 49.6 | Apr. 24 |
| Shawneetown, Ill..... | 33 | Mar. 26 | 2 | 44.1 | Apr. 5 |
| | | | | 50.4 | Apr. 24 |
| Dam No. 50, Fords Ferry, Ky..... | 34 | Mar. 24 | 2 | 46.9 | Apr. 5 |
| | | | | 52.9 | Apr. 23—24 |
| Dam No. 52, Brookport, Ill..... | 37 | Mar. 24 | 1 | 44.7 | Apr. 4 |
| | | | | 45.5 | Apr. 24 |
| Dam No. 53, near Mound City, Ill..... | 42 | Mar. 23 | 2 | 51.6 | Apr. 2 |
| | | | | 50.2 | Apr. 24 |
| | | | | 51.6 | Apr. 3 |
| Cairo, Ill..... | 40 | Mar. 22 | 2 | 47.3 | Apr. 16—17 |
| | | | | 47.9 | Apr. 23—25 |
| Arkansas Basin | | | | | |
| Neosho: Emporia, Kans..... | 20 | 2 | 3 | 25.5 | 3 |
| Poteau: Poteau, Okla..... | 21 | 12 | 14 | 25.6 | 13 |
| Red Basin | | | | | |
| Little: Whitecliffs, Ark..... | 25 | 14 | 18 | 26.0 | 15 |
| Sulphur: | | | | | |
| Hagansport, Tex..... | 38 | 11 | 19 | 41.0 | 12 |
| | | | | 40.1 | 18 |
| Naples, Tex..... | 22 | 12 | 30 | 29.4 | 15 |
| Cypress: Jefferson, Tex..... | 18 | 16 | 20 | 22.8 | 17 |
| MISSISSIPPI SYSTEM—continued | | | | | |
| Lower Mississippi Basin | | | | | |
| St. Francis: Fisk, Mo..... | Feet 20 | Mar. 19 | 20 | 20.6 | 19 |
| Tallahatchie: Swan Lake, Miss..... | 26 | Mar. 1 | 1 | 30.1 | Mar. 21 |
| | | | | 35.6 | Mar. 19—20 |
| Yazoo: Yazoo City, Miss..... | 29 | Mar. 1 | 17 | 35.6 | Mar. 23 |
| | | | | 35.6 | Apr. 9 |
| | | | | 35.4 | Apr. 14 |
| | | | | 40.5 | Apr. 3—5 |
| Mississippi: | | | | 37.3 | Apr. 17—18 |
| New Madrid, Mo..... | 34 | Mar. 25 | 2 | 37.5 | Apr. 24—26 |
| | | | | 37.5 | Apr. 26 |
| Caruthersville, Mo..... | 32 | Mar. 25 | 3 | 39.3 | Apr. 4—5 |
| Atchafalaya Basin | | | | | |
| Atchafalaya: | | | | | |
| Melville, La..... | 37 | Apr. 17 | Apr. 30 | 37.3 | Apr. 21—22 |
| | | | | 26.9 | Mar. 13—18 |
| Atchafalaya, La..... | 25 | Feb. 26 | 14 | 27.3 | Apr. 21—29 |
| WEST GULF OF MEXICO DRAINAGE | | | | | |
| Sabine: | | | | | |
| Mineola, Tex..... | 14 | 11 | 19 | 18.5 | 14, 15 |
| Gladewater, Tex..... | 26 | 13 | 26 | 35.4 | 18 |
| East Fork: Rockwall, Tex..... | 10 | 12 | 15 | 17.1 | 12 |
| Trinity: | | | | | |
| Rosser, Tex..... | 26 | 11 | 14 | 27.8 | 12 |
| Trinidad, Tex..... | 28 | 12 | 20 | 34.0 | 15 |
| Long Lake, Tex..... | 40 | 15 | 21 | 44.2 | 8 |
| Liberty, Tex..... | 24 | 22 | 30 | 26.1 | 7 |
| Rio Grande: | | | | | |
| Lobatos Bridge, Colo..... | 4 | 19 | (²) | 7.3 | 26 |
| Embudo, N. Mex..... | 8 | 22 | (²) | 12.3 | 27 |
| Espanola, N. Mex..... | 7 | 21 | (²) | 8.7 | 27 |
| Otowi Bridge, N. Mex..... | 9 | 27 | 28 | 9.3 | 27 |
| Albuquerque, N. Mex..... | 4 | 25 | 30 | 4.8 | 28 |
| GULF OF CALIFORNIA DRAINAGE | | | | | |
| Colorado Basin | | | | | |
| Gunnison: Delta, Colo..... | 11 | 19 | 24 | 12.4 | 20 |
| | | | | 12.3 | 22 |
| Animas: Durango, Colo..... | 4 | 5 | 9 | 4.9 | 7 |
| | | 16 | (²) | 7.2 | 20 |
| PACIFIC SLOPE DRAINAGE | | | | | |
| Columbia Basin | | | | | |
| Kootenai: | | | | | |
| Libby, Mont..... | 18 | 25 | (²) | 19.6 | 28 |
| Bonniers Ferry, Idaho..... | 31 | 23 | (²) | 35.3 | 29 |
| Flathead: | | | | | |
| Columbia Falls, Mont..... | 13.2 | 19 | (²) | 19.5 | 23 |
| Somers, Mont..... | 93 | 26 | (²) | | |
| Polson, Mont..... | 15.6 | 25 | (²) | | |
| Clark Fork: St. Regis, Mont..... | 17 | 21 | (²) | 20.6 | 24 |
| St. Joe: | | | | | |
| Calder, Idaho..... | 87 | 18 | (²) | 89.0 | 28 |
| St. Maries, Idaho..... | 35 | 19 | (²) | 39.2 | 30 |
| Coeur d'Alene: | | | | | |
| Cataldo, Idaho..... | 40 | 8 | (²) | 42.6 | 25, 26 |
| Coeur d'Alene Lake, Idaho..... | 30 | 1 | (²) | 36.0 | 30 |
| Spokane: Spokane, Wash..... | 27 | 23 | (²) | 28.3 | 30, 31 |
| Willamette: Portland, Oreg..... | 18 | 22 | (²) | | |
| Clearwater: Kamiah, Idaho..... | 14 | 20 | (²) | 21.2 | 29 |
| Snake: Lewiston, Idaho..... | 22 | 29 | 29 | 22.8 | 29 |
| Columbia: | | | | | |
| Boundary, Wash..... | 32 | 27 | (²) | | |
| Umatilla, Oreg..... | 25 | 27 | (²) | 30.5 | 30—31 |
| The Dalles, Oreg..... | 51 | 22 | (²) | | |
| Vancouver, Wash..... | 15 | 19 | (²) | | |

¹ Provisional.

² Continued at end of month.

¹ Provisional.² Continued at end of month.